

Claim 1 stands rejected under 35 U.S.C. Section 102 as being allegedly anticipated by each of Slatter (US 5,089,431), Kurtz (US 5,286,671), and Terasawa (US 5,930,651). These Section 102 rejections are respectfully traversed for at least the following reasons.

Claim 1 requires that "the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film insulator provided on the surface of the second semiconductor substrate contact each other with no circuit or device element located therebetween, to form a cavity in the semiconductor substrate device." For example, see Fig. 1D of the instant application which illustrates the concave-convex surface of first substrate 21 and thin film non-glass insulator 25 on the second substrate 24 brought together in contacting relation with no circuit or device element therebetween. The aforesaid claimed structure is advantageous in that, for example, the occurrence of a low dielectric constant layer which is sometimes generated can be prevented/reduced – thereby reducing parasitic capacitance generated between the concave-convex surface and the non-glass thin film insulator. Moreover, it is possible to reduce parasitic capacitance in certain example instances between a circuit or device element on the second substrate, and the first substrate, since the cavity may be filled with air or the like – thereby enabling high-frequency characteristics of an RF device to be improved. The cited art fails to disclose or suggest the aforesaid quoted and underlined aspect of claim 1.

Each of the three cited references has a circuit element between first and second coupled substrates. Slatter clearly discloses conductive pattern 20 and Schottky junction 21 (circuit or device element(s)) between the concave-convex surface of substrate 1 and

the layer 14 which are brought together. This structure of Slatter is expressly excluded by claim 1. Thus, Slatter cannot possibly disclose or suggest the "with no circuit or device element located therebetween" aspect of claim 1.

Kurtz '671 includes circuit/device elements 20 (piezoresistive bridge patterns used to form a Whetstone bridge) between the concave-convex surface of substrate 10 and the layer 33 which are brought together. This structure of Kurtz '671 is expressly excluded by claim 1. Thus, Kurtz '671 cannot possibly disclose or suggest the "with no circuit or device element located therebetween" aspect of claim 1.

Terasawa includes circuit/device elements 90, 32 (gate electrodes 90, gate regions 32) between the concave-convex surface of substrate 10 and the layer 20 which are brought together. This structure of Terasawa is expressly excluded by claim 1. Thus, Terasawa cannot possibly disclose or suggest the "with no circuit or device element located therebetween" aspect of claim 1.

Thus, it can be seen that none of Slatter, Kurtz '671 or Terasawa disclose or suggest the aspect of claim 1 that requires that no circuit or device element be located between the concave-convex surface of the first semiconductor substrate and the thin film insulator which contact each other. Instead, each of these references teaches directly away from the invention of claim 1 by requiring such a circuit or device element in the excluded location.

Independent claims 6 and 7 also including a similar limitation of "no circuit or device element located therebetween." As explained above, each of Slatter, Kurtz '671 and Terasawa fail to disclose or suggest this aspect of claims 6-7.

Claim 1 also stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Kurtz '322. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "a second semiconductor substrate having a non-glass thin film insulator on a surface thereof." This non-glass thin film insulator is then coupled to the concave-convex surface as further recited in claim 1. Kurtz '322 fails to disclose or suggest this aspect of claim 1. To the contrary, Kurtz '322 requires that element 40 be made of glass. This glass of Kurtz '322 is expressly excluded by claim 1. Thus, Kurtz '322 teaches directly away from the invention of claim 1. Even the alleged modification to Kurtz '322 under Section 103 would not meet the invention of claim 1 in this respect.

Claim 6 stands rejected under 35 U.S.C. Section 102(b) as being allegedly anticipated by Doyle. This Section 102(b) rejection is respectfully traversed for at least the following reasons.

Claim 6 requires that "the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film oxide insulator provided on the ion implanted surface of the second semiconductor substrate contact each other with no circuit or device element located therebetween, to form a cavity in the semiconductor substrate device."

Doyle fails to disclose or suggest the aforesaid quoted and underlined aspect of claim 6. To the contrary, Doyle in Fig. 5 illustrates conductive circuit interconnects 210, which are expressly excluded by claim 6. Again, Doyle is entirely unrelated to the invention of claim 6 in this respect.

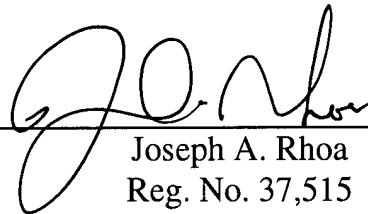
New claim 12 requires that "the non-glass thin film insulator has a thickness less than a thickness of the second semiconductor substrate on which the thin film insulator is provided, and wherein the thin film insulator is not a semiconductor." Slatter, for example, fails to disclose or suggest this aspect of new claim 12. Slatter's layer 14 is much thicker (not "less than" as required by claim 12) than alleged second substrate 15.

For at least the foregoing reason, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A semiconductor substrate device, comprising:

a first semiconductor substrate including a concave-convex surface; [and]

a second semiconductor substrate having a non-glass thin film insulator on a surface thereof,

wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film insulator provided on the surface of the second semiconductor substrate contact each other with no circuit or device element located therebetween, to form a cavity in the semiconductor substrate device.

6. (Amended) A semiconductor substrate device, comprising:

a first semiconductor substrate including a concave-convex surface; and

a second semiconductor substrate having a thin film oxide insulator on a surface thereof, the surface of the second semiconductor substrate on which the thin film oxide insulator is provided being implanted with hydrogen ions,

wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film oxide insulator provided on the ion implanted surface of the

second semiconductor substrate contact each other with no circuit or device element located therebetween, to form a cavity in the semiconductor substrate device.

7. (Amended) A semiconductor substrate device, comprising:
a first semiconductor substrate including a concave-convex surface; [and]
a second semiconductor substrate having a thin film Si layer on a surface thereof,
wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film Si layer provided on the second semiconductor substrate contact each other with no circuit or device element located therebetween, to form a cavity in the semiconductor substrate device.

Please add the following new claims:

12. (New) The device of claim 1, wherein the non-glass thin film insulator has a thickness less than a thickness of the second semiconductor substrate on which the thin film insulator is provided, and wherein the thin film insulator is not a semiconductor.

13. (New) The device of claim 7, wherein the thin film Si layer has a thickness less than a thickness of the second semiconductor substrate on which the thin film Si layer is provided.